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ABSTRACT

Data from the National Longitudinal Study (NLS) for a sample of students who had completed a four-year college course were examined for difference in locus of control (LOC) and self concept (SC) of persisters and changers in six college majors. Data were based on two four-item five-point questionnaire scales which were administered in 1972, 1973, 1974, and 1976. Data for each of the four years were factor analyzed separately with very similar results. Students were classified by college major into six categories and within each category were separated into two groups: those who persisted in the same major and those who did not. A repeated-measures analysis of variance for each of the college majors showed consistent increases in the self-concept scores over the four-year period. With respect to locus of control, three of the six majors showed steadily increasing scores: two majors also showed overall increases, but not a steady progression: and the remaining major had virtually the same score throughout the period.
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A Longitudinal Study of Self-Concept and Locus of Control for Persisters in Six College Majors[1]

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Developing a better understanding of the correlates of an individual's choice and successful completion of a college major has long been of interest to students and counselors alike. Much attention has been given to the examination of student traits and their relationship to the choice of and the eventual success rate in various college majors (Cappeto, 1978; Gottfredson & Holland, 1975; McCaulley, 1977). Two variables that have been related to decision making and goal persistence are locus of control (LOC) and self-concept(SC). Self-concept has been associated with individual differences in such areas as creativity, goal preference, competency, consistency of behavior and achievement (Kohr, 1974; Whiteside, 1977; Ziller, Hagey, & Smith, 1969). Locus of control has been found to relate to occupational attainment, motivation and expectancies (Andrisoni & Nestel, 1976; Broedling, 1975). These findings suggest that SC and LOC may partially explain an individual's willingness and ability to persist at a particular college major.

The primary purpose of this study is to explore differences in LOC and SC over time for persisters and changers in six college majors. Since the constructs of LOC and SC are of interest to many researchers, and because published information on these scales is incomplete (Tabler, 1977),

a second purpose is to report and discuss the factor analysis and reliability data for these scales.

Methodology

Instrumentation and Sample. A sample of 5,642 students enrolled in four year academic colleges was selected from the total of over 20,000 students available in the National Longitudinal Study (NLS) data set. Students were randomly selected under procedures that assured representativeness of the graduating class of 1972 (Levinsohn, Henderson, Riccobono, & Moore, 1978). The data were collected during the spring of 1972 and the fall of 1973, 1974, and 1976. Locus of control (LOC) and self-concept measures were composites of four items each.[1] The NLS codes, item stems and response formats are given in Appendix A. The previously reported reliability (coefficient alpha) of the LOC and SC measures for the initial year of administration were .56 and .66 respectively (Conger, Peng & Dunteman, 1977).

Analysis. The primary research hypotheses were examined by using a series of Type I repeated measures analyses of variance. "Persisters" were defined as those students who kept the same college major from their sophomore through their senior years. "Changers" were those students who switched majors during the period. Persistence, then, became the between factor and time was the within factor, with LOC and SC scores

[1] The LOC and SC composites were created by summing responses to the individual items and dividing by the number of nonmissing responses. Although the NLS tapes provide composites of this type, they were not used because of recoding problems. Namely, the numerical response "5" indicating "No Opinion" needed to be coded "3" and the codes of "3" and "4" needed to be recorded "4" and "5" respectively to insure the integrity of the data. There is some evidence that this was not done in the NLS composites and potential users of this data base should be forewarned.

serving as the dependent variables.

The secondary concern was examined with a varimax rotated principal component analysis and by generating alpha coefficients for all four years.

Results

The scales identified by the factor analysis for this sample of college students with the item stems and component loadings are given in Table 1. The components were identical, and the loadings quite similar, to the results reported for the entire sample (N = 16,400) in the NLS data set (Conger et al. 1977).

Insert Table 1 Here

The analyses of the data for the remaining three years demonstrated a stable factor structure for both the LOC and SC constructs. Using a loading criterion of .40, each principal components analysis yielded a simple structure. This pattern is shown in Table 2.

Insert Table 2 Here

Reliability data for both the total NLS sample (1972 only) and the current sample of college students (1972, 1973, 1974, and 1976) are shown in Table 3. Though higher reliabilities are desirable, the scales are reasonably suitable for use, particularly when the length of the scales, each having only four items, is considered.

Insert Table 3 Here

The results of the repeated measures analyses of variance for each of the college majors on self-concept and locus of control are shown in Tables 4 and 5. As can be seen in the tables, and as is usually the case in longitudinal studies, substantial attrition occurred owing to incomplete and missing data. Even with this problem, the ratio of changers to persisters never exceeded 2.4 to 1, as the N's in the table indicate.

Insert Tables 4 and 5 Here

The results for the RMANOVA's with self-concept as the dependent variable yielded significant main effects for time ($p < .001$) for each of the six college majors. The effects of persistence and the interaction were not significant. When LOC was used as the dependent variable, the results were mixed. For Business, Engineering and Education majors, only the main effect of time was significant ($p < .01$). For the Humanities/Fine Arts major, both persistence and time main effects were significant ($p < .05$). The Sciences/Math major yielded a significant interaction between persistence and the time dimension ($p < .05$). Only the Social Science major resulted in no significant difference.

An examination of the patterns of column marginals (Table 4) reveals that students in every college major exhibited steadily improving self-concepts over the four year period. Three of the six college majors (Business, Education, and Humanities/Fine Arts) demonstrated a pattern of becoming increasingly internal on the locus of control measure (Table 5). Two of the remaining three majors (Engineering and Science/Math) had more internal LOC scores in 1976 than they had in 1972, even though the progression was not steady. The remaining major (Social Science) had virtually the same average score throughout the period.

Discussion

The significant changes in LOC and SC across time support the hypotheses that as students view themselves as increasingly successful while approaching graduation, their self-concept becomes more positive and their perception of their control over the environment becomes more internal. Andrisoni & Nestel (1976) pointed to a similar tendency among individuals already engaged in various occupations in a study which concluded, "There is evidence that advancement in occupational status, advancement in annual earnings...are systematically related to increasing locus of control." (p. 162). Coopersmith & Feldman (1974) claimed, in their work with younger students, that increasing competencies and positive feedback from the environment about those competencies were important factors in developing favorable self-concepts. The data from the current study suggest that even the expectation of advancing status and earnings, and the perception of increased competencies associated with approaching graduation, can significantly affect students' self-concept and locus of control. The consistently large jump in scores just prior to graduation (1976 data) attests to the impact of these expectations.[2]

The finding that persisters did not consistently differ from changers on LOC and SC has at least two plausible explanations. The first is the fact that the changers, as well as the persisters did eventually graduate. To the extent that approaching graduation has an important effect on LOC and SC, this may have overshadowed between group differences. It is

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[2] It should be noted that some of the differences between the third and fourth measurements of LOC and SC may be attributable to the longer elapsed time between administrations of the questionnaires.

entirely possible that "persistence" in college, regardless of major, is of greater impact than persistence within a given major. The test for this hypothesis, of course, would be the examine LOC and SC with college drop-outs added to the design.

A second possibility rests with the LOC and SC measures employed. Although the factor analysis and reliability results for the short composites used in this study compare reasonably well with other generalized measures, such as Rotter's (1966) LOC instrument, a measure more sensitive to an academic environment could achieve greater success at uncovering differences between groups. One such instrument is the Intellectual Achievement Responsibility Questionnaire (Crandall, Katho sky & Crandall, 1965).

The patterns of changes in LOC and SC suggest that students may stagnate or level off in their personal development during their sophomore and junior years in college. This seems particularly apparent for LOC in the more technical majors (Engineering and Sciences/Math) where persisters actually moved toward an external LOC during their mid-college careers. This appears to support an hypothesis that students engaged in coursework that is more abstract and less relevant to their current existences may suffer temporary "depressions" on their way towards a degree.

Summary

Counselors should recognize that students in all majors apparently develop more positive self-concepts and more internal loci of control as they approach graduation. The evidence further suggests that some major fields, particularly those technically oriented, have a negative (albeit temporary) effect on students feelings of control. A distinct possibility

is that there may be an increase in the number of students wishing to change majors during this period. This is, however, only speculation at this time and requires substantiation through further research.

Additional areas for further inquiry would include replication of the design with added related variables. One such variable is sex, which research has linked to both personality variables and career choice differences (Fogelman, 1979; Harren, Kass, Tinsley & Moreland, 1978). Replication with measures more sensitive to changes in an academic environment could prove fruitful. Finally, an investigation of specific differences across college majors appears necessary, particularly because of the patterns emerging from the LOC measure.

Table 1

Self-Concept and Locus of Control Scales Resulting From a Principal Components Analysis of 1972 Data

Item Number	Item Stem	Loading
Factor 1: Self-Concept		
1	I take a positive attitude toward myself.	.76
2	I feel I am a person of worth, on an equal plane with others.	.72
3	I am able to do things as well as most other people.	.69
4	On the whole, I'm satisfied with myself.	.65
Factor 2: Locus of Control		
5	Good luck is more important than hard work	.64
6	Every time I try to get ahead, something or somebody stops me.	.59
7	Planning only makes a person unhappy since plans hardly ever work out anyway.	.72
8	People who accept their condition in life are happier than those who try to change things.	.60

Table 2

Component Loadings for 1972, 1973, 1974, and 1976 Data[1]

Item Number	Year							
	1972		1973		1974		1976	
	Factor 1	Factor 2	Factor 1	Factor 2	Factor 1	Factor 2	Factor 1	Factor 2
1	.76		.76		.79		.79	
2	.72		.75		.77		.80	
3	.69		.72		.74		.77	
4	.65		.68		.72		.72	
5		.64		.61		.63		.63
6		.59		.60		.63		.68
7		.72		.72		.74		.74
8		.60		.57		.56		.58

[1]For ease of interpretation, only loadings greater than .40 were presented.

Table 3

Reliability Data for Self-Concept

and Locus of Control Scales[1]

Scale	NLS Sample 1972[2]	Sample of 5,642 College Students 1972	1973	1974	1976
Factor 1: Self-concept	.66	.67	.70	.76	.79
Factor 2: Locus of Control	.56	.52	.49	.54	.57

[1]Coefficient Alpha

[2]Taken from Conger, Peng, & Dunteman (1977)

Table 4

Results of Type I Repeated Measures Analyses of Variance

for Six College Major Groups on Self-Concept[1]

Majors	Between Factor (Group)	Cell Means 1972	1973	1974	1976	Total	Significance of Grouping Factor	Significance of Time Factor	Significance of Interactions Factor	N
Business	**Persisters**	1.97	1.89	1.75	1.64	1.81		***		276
	Changers	1.99	1.86	1.74	1.73	1.83				236
	TOTAL	1.98	1.87	1.75	1.68	1.82				
Education	Persisters	2.06	1.88	1.77	1.61	1.83		***		220
	Changers	2.05	1.80	1.70	1.64	1.80				258
	TOTAL	2.05	1.84	1.74	1.62	1.81				
Engineering	Persisters	1.89	1.77	1.71	1.64	1.75		***		83
	Changers	1.94	1.83	1.83	1.73	1.83				97
	TOTAL	1.92	1.80	1.77	1.68	1.79				
Humanities/ Fine Arts	Persisters	1.95	1.79	1.70	1.63	1.76		***		136
	Changers	2.01	1.89	1.75	1.66	1.83				205
	TOTAL	1.98	1.84	1.72	1.64	1.80				
Biological & Physical Sciences/Math	Persisters	1.88	1.81	1.77	1.66	1.78		***		153
	Changers	1.95	1.81	1.72	1.63	1.77				348
	TOTAL	1.91	1.81	1.74	1.64	1.78				
Social Sciences	Persisters	1.90	1.81	1.80	1.65	1.79		***		180
	Changers	1.96	1.83	1.76	1.67	1.81				272
	TOTAL	1.93	1.82	1.78	1.66	1.80				
Total	Persisters	1.95	1.84	1.76	1.64	1.80		***		1,048
	Changers	1.98	1.83	1.74	1.67	1.81				1,416
	TOTAL	1.97	1.84	1.75	1.65	1.80				

*p < .05 **p < .01 ***p < .001

[1] A score at 1.00 indicates a positive self-concept

Table 5

Results of Type I Repeated Measures Analyses of Variance

for Six College Major Groups on Locus of Control[1]

Majors	Between Factor (Group)	Cell Means 1972	1973	1974	1976	Total	Significance of Grouping Factor	Significance of Time Factor	Significance of Interactions Factor	N
Business	Persisters	3.92	3.98	4.01	4.12	4.00		***		269
	Changers	3.95	4.02	4.03	4.10	4.03				235
	TOTAL	3.93	4.00	4.02	4.11	4.02				
Education	Persisters	4.00	4.05	4.05	4.08	4.05		**		227
	Changers	3.94	3.97	3.99	4.09	4.05				251
	TOTAL	3.97	4.01	4.02	4.09	4.02				
Engineering	Persisters	4.06	4.00	3.94	4.18	4.04		***		79
	Changers	3.99	3.94	3.97	4.09	4.00				93
	TOTAL	4.02	3.97	3.95	4.14	4.02				
Humanities/ Fine Arts	Persisters	4.08	4.15	4.18	4.24	4.16	*	*		137
	Changers	4.05	4.05	4.04	4.10	4.06				213
	TOTAL	4.07	4.10	4.11	4.17	4.11				
Biological & Physical Sciences/Math	Persisters	4.13	4.03	4.03	4.10	4.07			*	152
	Changers	4.06	4.10	4.13	4.16	4.12				357
	TOTAL	4.10	4.07	4.08	4.13	4.09				
Social Science	Persisters	4.12	4.14	4.09	4.12	4.12				177
	Changers	4.11	4.06	4.11	4.09	4.09				273
	TOTAL	4.12	4.10	4.10	4.11	4.10				
Total	Persisters	4.03	4.05	4.05	4.13	4.07				1,041
	Changers	4.03	4.04	4.06	4.11	4.06		***		1,422
	TOTAL	4.03	4.05	4.06	4.12	4.06				

*p < .05 **p < .01 ***p < .001

[1] A score of 1.00 indicates an external locus of control

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Appendix A

NLS Codes, Item Stems, and Response Format for Self-Concept and Locus of Control Items

Number	Item Stem	Response Formats				
		Agree Strongly	Agree	Disagree	Disagreed Strongly	No Opinion
1	I take a positive attitude toward myself.	1	2	3	4	5
5	Good luck is more important than hard work for success.	1	2	3	4	5
2	I feel I am a person of worth, on an equal plane with others.	1	2	3	4	5
3	I am able to do things as well as most other people.	1	2	3	4	5
6	Every time I try to get ahead, something or somebody stops me.	1	2	3	4	5
7	Planning only makes a person unhappy since plans hardly ever work out anyway.	1	2	3	4	5
8	People who accept their condition in life are happier than those who try to change things.	1	2	3	4	5
4	On the whole, I'm satisfied with myself.	1	2	3	4	5

NLS Codes

Item Number	1972	1973	1974	1976
1	BQ21A	FQ15A	SQ132A	TQ148A
5	BQ21B	FQ15B	SQ132B	TQ148B
2	BQ21C	FQ15C	SQ132C	TQ148C
3	BQ21D	FQ15D	SQ132D	TQ148D
6	BQ21E	FQ15E	SQ132E	TQ148E
7	BQ21F	FQ15F	SQ132F	TQ148F
8	BQ21G	FQ15G	SQ132G	TQ148G
4	BQ21H	FQ15H	SQ132H	TQ148H